

CANCER OF THE BREAST

Results of Treatment in Northern Ireland, 1955-1959

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THE RESULTS of treatment presented in this paper are those obtained in Northern Ireland in certain cases of breast cancer during the years 1955 to 1959. The year 1955 was chosen for the start of the study, as in that year for the first time a sufficient number of simple mastectomies for comparison with radical mastectomies was carried out. For various reasons it was not possible to initiate a random trial though it is fully recognised that such a trial would have been the proper way to investigate the value of each treatment method.

The study, therefore, is a retrospective one, and contains within it a group of cases in which thyroid hormone was used as a prophylactic agent against metastases. This group of cases was contrasted by random selection against a similar group receiving no thyroid hormone, and there is no difference in the results of treatment between the two groups at the period chosen for assessment. A full report of this investigation will be published elsewhere. It is not considered that the presence of these groups can influence the conclusions which can be drawn from the overall results in this paper.

MATERIAL AND METHODS

A total of 947 cases of breast cancer were referred to the Radiotherapy Department during the years 1955 to 1959. Of these 213 cases, including those with bilateral tumours, or those with disease which had extended beyond the axilla, either to the supraclavicular region or to distant sites were excluded. Three cases of cancer in the male breast were also excluded.

The remaining 731 cases having had surgery were treated by radiation. All had histological confirmation of the disease. They had had no treatment previously which could have influenced breast cancer, either in the affected breast or in the opposite breast. There were ten cases of pregnancy carcinoma. None of the patients had previous chemotherapy. The small number of patients who had oophorectomy were statistically distributed equally between the groups who had different forms of surgery.

Because of problems of geography and shortage of staff in the Radiotherapy Department it was not possible to see more than a small fraction of the cases pre-operatively, but great care has been taken to obtain full pre-operative findings, though this has not been possible in every case.

686 cases were suitable for final analysis, as shown in the following table. It seemed a little illogical to discuss five year survival in those aged 75 or over.

TABLE 1.
NUMBER OF CASES IN 5 YEAR SURVIVAL FOR ANALYSIS.

Total	-	-	751
Not Analysed	-	-	45
Follow-up inadequate	-	-	6
No surgery or biopsy only	-	-	10
Biopsy/Excision	-	-	10
Over 75 years	-	-	19
Available for Analysis	-	-	686

Staging :

The cases were divided into three stages, as follows :

Stage I—These were cases whose tumours were either unattached to skin or pectoral fascia, or who showed only slight attachment to these structures. Patients were placed in this category with the above criteria even when their tumours were very large, provided no lymph nodes were palpable in the axilla, and no distant metastases were present. A minor degree of skin ulceration did not exclude patients from this stage, but patients with more than one tumour palpable in the breast were excluded.

Stage II—Clinical findings were the same as for Stage I, but in addition the patient had palpable mobile glands in the axilla on the same side as the tumour.

Stage III—In this group of patients the tumour was locally advanced, either fixed to the skin, or fixed to pectoral fascia. Patients with fixation of the tumour to the chest wall were excluded. Matting of the axillary nodes without fixation to the chest wall did not exclude the patients from this stage.

In all cases staging was decided on the basis of pre-operative findings, and was not altered subsequently on histological or other evidence.

Types of Surgery :

The type of mastectomy carried out was varied, and this mostly by individual surgeons. Only a small number of surgeons restricted themselves to one type of operation.

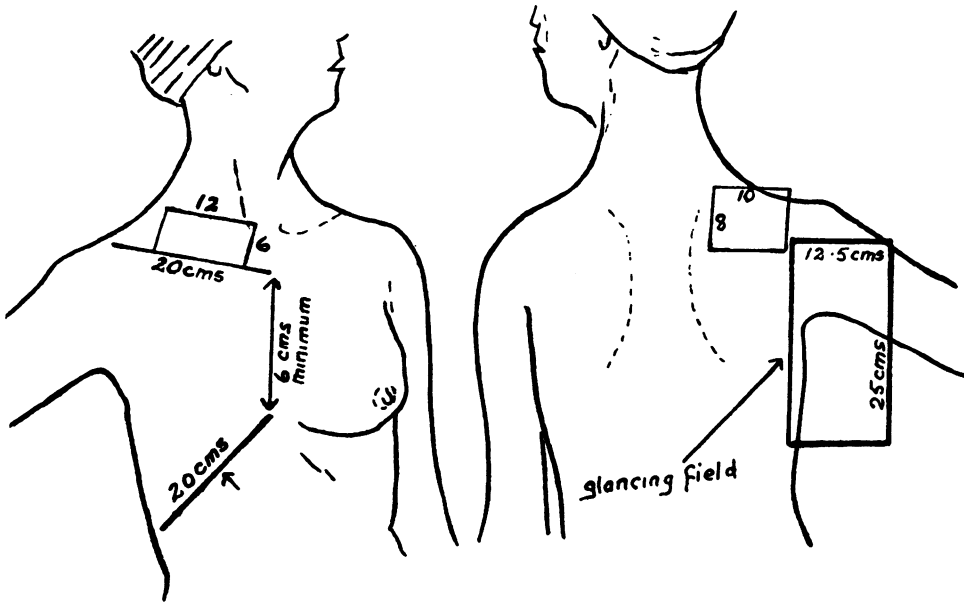
On many occasions, an operation which was not a full radical mastectomy was carried out, the axilla was opened, and there was a partial resection of lymph nodes. This procedure has been named modified radical mastectomy. For this reason the surgical treatment has been divided into three groups :

1. *Radical Mastectomy* in which the surgeon has reported a complete clearance of the axilla and a removal of the whole breast.
2. *Modified Radical Mastectomy* as defined above.
3. *Simple Mastectomy* in which either the breast alone was removed, or the breast plus lymph nodes in the subpectoral group on the antero-lateral chest wall outside the axilla.

Radiotherapy :

Two methods of treatment have been employed :

1. In those cases who had had simple mastectomy the radiation treatment plan consisted of two large opposed fields to include the axilla, and the supra-clavicular region on the affected side, and two tangential fields to the chest wall. This is substantially the treatment plan advocated by McWhirter in Edinburgh, and the maximum tissue dose was about 4,000 rads in three weeks. The plan of treatment is shown in the line diagram below.



2. In those patients who had radical mastectomy, because the scar was longer the area was not suitable for treatment with the above method, and in those cases a type of treatment using three tangential fields to the chest wall, plus a supraclavicular field in many cases, was employed. It is well recognised that radiation combined with radical mastectomy leads to an increased incidence of oedema of the arm, and because of this, dosage to the axilla was reduced by about 12 per cent to 3,700 rads. Even with this dosage severe oedema of the arm occurred, and the number of cases developing this will be shown. The plan of treatment is shown in the following line diagram.

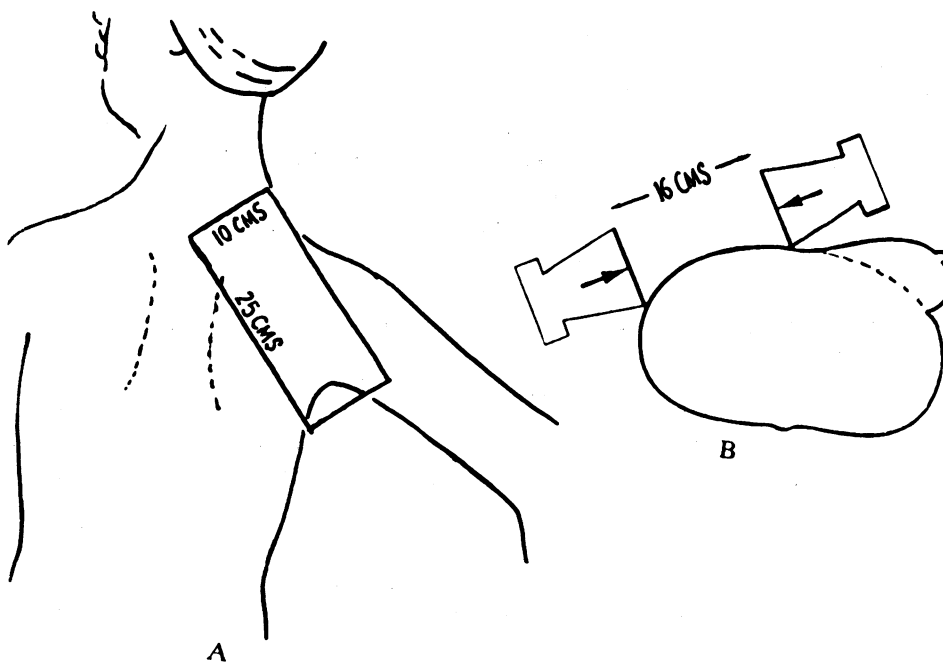
RESULTS

On the basis of the division of the cases into groups with three different types of surgery, and using staging in the way described, the results of the study can be expressed in Table II.

The better results in Stage II with simple mastectomy in comparison with the other forms of surgery are statistically significant. Elsewhere in the results there is no statistical difference.

TABLE II.
RESULTS OF TREATMENT OF BREAST CANCER EXPRESSED AS 5 YEAR SURVIVALS
USING DIFFERENT TYPES OF SURGERY
ALL CASES HAD POST-OPERATIVE RADIATION

	<i>Type of Mastectomy</i>		
	<i>Radical Mastectomy</i>	<i>Modified Radical Mastectomy</i>	<i>Simple Mastectomy</i>
Stage I	42/54 (82.3%)	15/22 (68.2%)	138/188 (73.4%)
Stage II	71/137 (51.8%)	31/59 (52.5%)	84/132 (63.6%)
Stage III	11/27 (40.7%)	3/14 (21.4%)	19/53 (35.8%)



A. The posterior shoulder field used after simple mastectomy to irradiate the supraclavicular and axillary nodes in continuity. The position of the glancing fields in transverse section is shown in B.

To allow for differences of age in the groups, the results were shown corrected for age in Table III.

TABLE III.
COMPARISON OF RELATIVE PROBABILITIES (PER CENT.)+, OF SURVIVAL TO FIFTH ANNIVERSARY OF DATE OF FIRST TREATMENT, BETWEEN STAGES AND BETWEEN TREATMENTS

	<i>Type of Mastectomy</i>		
	<i>Radical Mastectomy</i>	<i>Modified Radical Mastectomy</i>	<i>Simple Mastectomy</i>
STAGE I	85.3± 5.7%	73.3±12.0%	77.2±4.5%
STAGE II	54.6± 4.8%	41.2± 6.8%	70.2±5.0%
STAGE III	42.0±11.2%	22.0±12.3%	35.3±7.6%

The better results in Stage II with simple mastectomy in comparison with the other forms of surgery are statistically significant. Elsewhere in the results there is no statistical difference.

Table IV indicates the percentage 5 year survival in "operable" cases (Stages I and II) :

TABLE IV.
PERCENTAGE 5 YEAR SURVIVAL IN OPERABLE CASES (STAGES I AND II)

Radical Mastectomy	-	191 cases—67%
Modified Mastectomy	-	81 cases—60.3%
Simple Mastectomy	-	320 cases—68.5%

The results in the above table are of interest because of their remarkable similarity.

The tendency for surgeons to carry out more conservative surgery in the Stage I cases might lead to the belief that smaller tumours could be present in those patients who had conservative surgery in all the cases operated on, that this was not so in fact, is shown in Table V, which expresses the mean tumour size, and the various stages with both treatment methods.

TABLE V.
FIVE YEAR GROUP—MEAN TUMOUR SIZE

<i>Type of Operation</i>	<i>Simple Mastectomy</i>	<i>Mastectomy Modified Radical Mastectomy</i>	<i>Radical</i>
Stage I	3.4 cms.	3.0 cms.	3.7 cms.
Stage II	3.7 cms.	3.8 cms.	3.7 cms.
Stage III	5.0 cms.	5.4 cms.	5.2 cms.

The siting of the tumours in each stage and with each treatment method could well be of importance, but as Table VI shows the only significant difference is in the percentage of tumours in Stage I which were situated in the inner half of the breast when simple mastectomy was carried out.

TABLE VI.
PERCENTAGE DISTRIBUTION—SITE OF TUMOUR

<i>Type of Operation</i>		<i>Inner Half</i>	<i>Outer Half</i>	<i>Centre</i>
STAGE I				
Radical Mastectomy	-	9	72	19
Simple Mastectomy	-	41	46	13
STAGE II				
Radical Mastectomy	-	24.2	59.3	16.5
Simple Mastectomy	-	24.5	52.6	23
STAGE III				
Radical Mastectomy	-	25	37.5	37.5
Simple Mastectomy	-	31	45	24

The only point to note here is the figure of 9 per cent, being the number of tumours in the inner half of the breast in the cases who had radical mastectomy in Stage I.

As has already been stated the incidence of severe oedema of the arm after radical mastectomy gives cause for concern, and the number of cases who develop such severe oedema is shown in Table VII.

TABLE VII.
INCIDENCE OF OEDEMA OF ARM

Number of Cases	-	-	-	41
Radical Surgery	-	-	-	33/313=10.5%
Simple Surgery	-	-	-	8/373= 2.2%

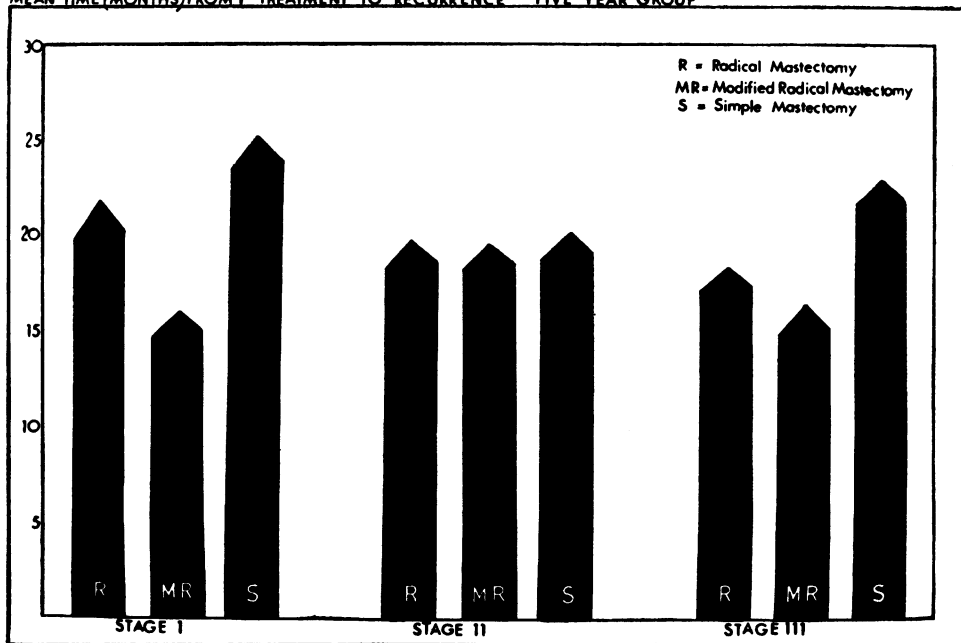
Perhaps of equal interest to the 5 year survival rate resulting from the various treatments are the times of initial recurrence after first treatment, when the different treatment methods in each stage are studied. The findings in the figure below will be discussed later.

DISCUSSION

An assessment of the outcome of the treatment methods for breast cancer considered in this paper lends support to the belief that the extent of surgery carried out for this disease has little effect on the 5 year survival rate. Unfortunately, it is not possible to state any conclusions about the value of radiotherapy. However, if the concept of residual disease giving rise to distant metastases, and

so killing the patient is accepted, it would be logical to apply radiation after conservative surgery to those areas where nodes are known to become involved, and to the parasternal node areas after radical surgery, particularly in inner half tumours. It could not be desirable to leave patients who have had conservative surgery without radiation, as if this were accepted there would be no logical reason for doing a radical mastectomy in a patient.

MEAN TIME (MONTHS) FROM 1st TREATMENT TO RECURRENCE FIVE YEAR GROUP



It is of interest to study the intervals between the initial treatment and local or distant recurrence. In Stages I and III (Fig. above) the findings favour simple mastectomy, and the intervals are remarkably constant in Stage II for all treatment methods. It will be noted too that the shortest times to recurrences in Stages I and III are found when the axilla is interfered with, but inadequately dissected. Apart from these exceptions there is a remarkable similarity in the timing of further disease in all stages and in all treatment methods.

In considering the larger overall reports of the results between different methods of treatment in breast cancer it has to be borne in mind that comparison of the results in different series of cases between radical and conservative surgery is difficult unless certain facts are known. It is certainly advantageous to learn the overall crude survival rate in any given series of patients, but this must obviously vary between one series and another, depending on the percentage of late and early cases. Yet in the statements of some authors this is not always taken into account. Even if a complete similarity could be obtained at this level the zest for treatment of metastatic disease may vary from one centre to another so conceivably altering the final assessment at a given point in time which is usually five years. For these reasons it has been thought worthwhile to present the results under

nine sub-divisions which allow a more true comparison of treatment methods even though in some groups the figures will inevitably be rather small. It will have to be accepted that the hormone management of metastases in these patients has been fairly uniform, as it has been carried out almost entirely by doctors attached to the Northern Ireland Radiotherapy Centre

Because there can be very considerable variation in size of tumours within any given clinical stage it is worth noting that the mean size of the tumours treated in each stage was comparable, and as regards siting, the comment has already been made that the only significant variation was in the percentage of inner half tumours in Stage I. From the known lymph node dissemination of inner half tumours the results obtained by simple mastectomy in this group of Stage I cases would suggest that simple mastectomy is at least of equal efficacy in the control of the disease at this stage.

A review of the literature in a comprehensive way about the treatment of breast cancer is almost impossible because it is so vast, but the main impression gained is that the findings in this paper are supported by powerful evidence from elsewhere. McWhirter (1948 a and b, 1949 a and b, 1955, 1956), for many years has been a protagonist of the value of simple mastectomy followed by radiation, and he has produced figures in a large series of patients which will stand up to comparison with those of others who have practised the most meticulous radical mastectomies. McWhirter's figures were attacked in an interesting paper by Watson (1959) in a series showing results in 1,055 cases in Saskatchewan, and treated between 1944 and 1952. Watson reported a 5 year survival rate of 52 per cent after radical mastectomy, as compared with 42 per cent 5 year survival rate in the McWhirter series of cases treated between 1941 and 1947. It is to be noted, however, that Watson's series contain 75 per cent of operable cases as against 62 per cent in the Edinburgh series, underlining the comment made above that useful comparison can only be carried out between tumour groups if they are in fact fully comparable. No attempt has been made to investigate the effects of hormone therapy in either of the 5 year survival rates compared.

Many other authors have produced evidence to support the contention that more conservative surgery may be just as effective as any other form in this disease. Deaton and Greene (1955) in a review of some of the work published up to 1955 on the problem reported on a series of 2,995 cases of operable breast cancer treated by radical mastectomy, and showed that in these cases there was a 54.5 per cent survival. He referred to work by Clifton and Young (1951), Engelstad (1948), Bell (1949), Richardson (1948), and Haagenson and Stout (1951), and he contrasted this with another large series of patients, 808 in all, derived from various other sources—Orr (1950), Saugmann-Jensen and Jacoby (1950), Fitzwilliams (1940), Mustakallio (1949), Nohrmann (1949) and Hartmann (1950) who had simple mastectomy followed by radiation. In this group there were 482 survivors in 5 years, or a 5 year survival rate of 59.8 per cent. It will be noted that the figures in these two large contrasted groups from many different sources are very similar to those of our own.

The results of a co-operative international study (Haagensen et al (1963) on the treatment of early mammary carcinoma were published in February, 1963.

The "Columbia" classification of staging was used and defined, and the results of different methods of treatment were compared. It was recognised by the authors that as many factors would enter into a true comparison of results, some have to be dispensed with as otherwise the numbers would be too small in the sub-groups for any valid comparison to be made. Tumour grading was excluded though the importance of grading in addition to staging for determining prognosis has been demonstrated by Bloom (1951) and others. The authors did not mention mean tumour size in comparing their results, but on the other hand gave very great care to the proper staging of their cases.

The best results in this study were obtained by Haagensen and Cooley, Haagensen has already defined the criteria for radical mastectomy, and since 1951 has added a study of regional lymph nodes at the apex of the axilla, and in the first, second and third interspaces before surgery is undertaken in certain types of cases. If any of these nodes are involved by tumour, radical surgery is not undertaken. When all the criteria defined by Haagensen for surgery are present, the 5 year survival rate in the patients so selected is 82.2 per cent. This group of cases must be regarded as a most highly selected one which has been rationally treated, and it is to be noted that not less than 35-50 lymph nodes are obtained at each operation, and that the mean operating time is 5 hours 30 minutes. A careful analysis of the lymph nodes taken at operation shows conclusively that the prognosis is most definitely related to the number of lymph nodes involved in all stages, thus suggesting that the invasive characteristics of any given tumour, or the host defences to it are what will really determine the outcome of treatment.

Both Haagensen's own paper in this International Study and that of Dahl-Iversen and Tobiasen, illustrate the difficulty of comparison of selected types of cases with those of other centres, and it is for this reason that a paper included in the study by Kaae and Johansen using the same staging is of very great interest. In this paper all the patients presenting with breast cancer for treatment have been divided into two random groups. The first group had as treatment a simple mastectomy and post-operative radiation by the McWhirter method. In the second group the patients were treated by extended radical mastectomy by the method of Dahl-Inversen, and none of these patients received post-operative radiation. The primary examination, the follow-up, and the staging were all carried out at the Radium Centre in Copenhagen.

The results of both groups are statistically the same, though there are not adequate numbers for comparison in the stages 'C' and 'D' as defined in the "Columbia" classification. It is, however, in these late groups that good results cannot be expected from radical mastectomy, if indeed it should ever be done, but comparison of the earlier results is of considerably interest.

In further support of the effectiveness of conservative treatment the findings of Mustakallio (1955) may be mentioned. He reported on 127 cases to whom treatment was given by biopsy/excision followed by radiation to the axilla, parasternal and supraclavicular regions. Of these patients 107 or 84 per cent lived 5 years or longer. This treatment has been confined to Stage I cases, and he has reported no results in Stage II. He has confirmed the continuing success of the method (Mustakallio, 1964).

Porritt (1964) reporting on 263 cases of breast cancer found in those treated by local excision and radiotherapy a better survival rate than in those treated by the radical operation and sometimes combined with radiation. In the cases who had conservative surgery a "segmental mastectomy" was carried out and in some cases who had this procedure if a palpable gland was felt this was removed from the axilla as well.

In deciding on a policy for the treatment of breast cancer it is natural that very considerable caution should be exercised. This is especially so in early cases. A consideration of the pathogenesis of malignant breast tumours makes it clear, however, that radical surgery will either be unnecessary in a high proportion of cases, or will fail because of extension of the disease beyond the confines of the operation. Taking into account the staging of the tumour, and the incidence of parasternal and supraclavicular lymph node involvement in cases staged I and II it is evident that in only a very small proportion can radical surgery be logically beneficial. These cases will be those in Stage II who have nodal involvement entirely confined to the lower part of the axilla, but these cases are in fact the ones who most markedly demonstrated no benefit from radical surgery in this series.

It is suggested that a very great step forward would have been made in the treating of this disease if the results in women who had had a biopsy excision, or at most a wedge resection, followed by X-ray treatment could be shown to be as good as those following more radical surgery. Obviously such patients would have retained their breasts, and having megavoltage radiation would have experienced much less skin reaction than with orthovoltage. The combination of these two changes in treatment policy would make for a very different final anatomical result from that seen with the therapeutic programme offered today.

SUMMARY

In Northern Ireland 947 cases of breast cancer occurring between 1955 and 1959 were referred for post-operative radiotherapy. Of these 686 were in stages I, II and III and were treated by either modified radical or simple mastectomy.

The over-all results of treatment do not appear to be influenced by the extent of the surgery carried out, though in Stage II cases the outcome statistically favours simple mastectomy.

The findings of other workers are discussed and a suggestion is made that more conservative surgery still, combined with megavoltage radiotherapy, be considered as a suitable treatment method in many cases of this disease.

I would like to thank the many surgeons who referred their patients for radiotherapy. The work analysed in this paper is obviously one of joint activity between surgeons and radiotherapists.

I am most grateful to Professor Eric Cheeseman for his interest and advice; without his help the task of compiling the figures would have been infinitely more difficult.

I am indebted to Dr. George Edelstyn for much work on the case material, and to Miss Grace Marshall and her staff for typing the script.

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